ABSTRACT

Background: The human organism is exposed daily to many endogenous and exogenous substances that are the source of oxidative damage. Cell structures, including DNA (deoxyribonucleic acid) in the nucleus are damaged due to high concentrations of these substances and accumulation of oxidative stress in cells. The predominance of these damaging processes may later be responsible for human diseases such as cancer, neurodegenerative diseases or heart failure. In our study, we observed oxidative damage at the DNA level due to spinal anesthesia.

Methods: Sample processing was performed by comet analysis. The principle consists in fixation of cells (lymphocytes) in the agarose gel, lysis of cell structures for nucleotide release, incubation with specific enzymes and exposure to electrophoresis. Damaged, negatively charged parts of the DNA in the electric field are directed to the positive charged anode, creating a typical comet shape. For visualization, the gels were stained with ethidium bromide (DNA intercalating dye).

Results: We have quantified single-strand breaks, oxidized purines and pyrimidines (use of enzymes to detect specific damages). The results are reported in percentage of DNA in the comet's tail. The principle is to compare the intensity of the comet's tail with the total comet intensity. The evaluation was executed in semi-automated software LUCIA Comet Assay (Laboratory Imaging, Czech Republic).

Conclusion: The assessment of injury was determined in lymphocytes obtained before spinal anesthesia and compared with the results analyzed after anesthesia in an individual. The results of all observed parameters indicate statistically insignificant damage caused by spinal anesthesia.

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Key words: anesthesia, comet assay, DNA damage, repair